

WHAT IS CLAIMED IS:

1. A data relay method of establishing a logical tunnel within a specified backbone network disposed between networks, and relaying data having a specified format  
5 between the networks through the tunnel, said method comprising:

a determining step of determining a type of a destination address at the Data Link layer from the data loaded from the network into the backbone network;

10 a transmitting step of transmitting the data to the tunnel as a relay destination that is determined for each address when the determined type is an address for an individual; and

an identifying/transmitting step of identifying the  
15 relay destination tunnel from data contents set in correlation with the destination address at the Network layer when the type is an address for broadcast, and of transmitting the data to the identified relay destination tunnel.

20 2. The data relay method according to claim 1 further comprising:

a determining step of determining whether a relay system of data to a destination is the one performed at  
25 the Data Link layer when the data is to be transmitted

to the relay destination tunnel;

a removing step of removing header for the Data Link layer from the specified format when the relay system is not the one performed at the Data Link layer; and

5 an adding step of adding header for the Data Link layer to the data when the data is received through the relay destination tunnel.

3. A data relay method of establishing a logical tunnel  
10 within a specified public network disposed between a specified backbone network and host devices, and relaying data between the backbone network and said host devices through the tunnel, said method comprising:

a first determining step of monitoring contents of  
15 the data loaded from said host device and determining whether the data is user data;

a first relaying step of relaying data through the tunnel when the data is the user data; and

a control processing step of performing control  
20 processing on the data without being routed through the tunnel when the data is a predetermined control packet.

4. The data relay method according to claim 3 further comprising:

25 a second determining step of monitoring data loaded

from the backbone network and determining whether the data is targeted for a single traffic;

a second relaying step of relaying the data through the tunnel when the data is targeted for the single traffic;

5 and

a storage controlling step of storing data as the target to be controlled when the data is the predetermined data as a target to be controlled,

10 wherein, in the control processing step, the control processing is performed on the stored data as a target to be controlled.

5. A data relay method of relaying data between a specified backbone network and host devices through a public network, said method comprising:

an address converting step of converting a destination of data transmitted from the backbone network to a specific IP address within the public network, to a broadcast address of a particular group previously set;

20 a forwarding step of forwarding the data, whose address has been converted, to a multicast network within the public network; and

a distributing step of distributing the forwarded data to said host devices.

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6. A data relay apparatus, disposed within a specified backbone network interposed between networks, which relays data having a specified format from the network through a logical tunnel established within the backbone network, said apparatus comprising:

a storage unit that stores information for a relay destination tunnel in correlation with a destination address at the Network layer of the data;

a type determination unit that determines a type of a destination address at the Data Link layer of the data loaded from the network; and

a transmission unit that transmits the data to the relay destination tunnel corresponding to the destination address at the Network layer stored in said storage unit when the type of the destination address is a broadcast address.

7. The data relay apparatus according to claim 6, wherein said storage unit further stores information for a relay destination tunnel and hierarchical information for a relay system in correlation with a destination address at the Network layer of the data,

said data relay apparatus further comprising:

a system determination unit that determines a relay system of data to a transmission destination from the data

contents stored in said storage unit when the data is to be transmitted to the relay destination tunnel;

a removal unit that removes header for the Data Link layer from the specified format when the determined relay system is not the one performed at the Data Link layer; and

an adding unit that adds the header for the Data Link layer to the data and relays the data when receiving the data through the relay destination tunnel.

8. A data relay apparatus, disposed within a specified public network interposed between a specified backbone network and host devices, which relays data between the backbone network and said host devices through a logical tunnel established within the public network, said apparatus comprising:

a first type determination unit that monitors contents of the data loaded from said host device and determines a type of the data;

a first relay unit that relays data through the tunnel when the type of the data is targeted for a single traffic; and

a control processing unit that performs control processing on the data without being routed through the tunnel when the data is a predetermined control packet.

9. A data relay apparatus, disposed within a specified public network interposed between a specified backbone network and host devices, which relays data between the backbone network and said host devices through a logical  
5 tunnel established within the public network, said apparatus comprising:

a second type determination unit that monitors contents of the data loaded from the backbone network and determines a type of the data;

10 a second relay unit that relays the data through the tunnel when the type of the data is targeted for a single traffic; and

a storage control unit that stores the data when the type of the data is targeted for broadcast to a particular  
15 group.

10. A data relay apparatus, disposed within a specified public network interposed between a specified backbone network and host devices, which relays data between the  
20 backbone network and said host devices through a logical tunnel established within the public network, said apparatus comprising:

an address conversion unit that converts a destination of data transmitted to a specific IP address  
25 within the public network, to a broadcast address of a

particular group previously set;

a forwarding unit that forwards the data, whose address has been converted, to a multicast network logically constituted within the public network; and

5 a distribution unit that distributes the forwarded data to said host devices.

11. A data relay system, having a logical tunnel established within a specified backbone network disposed  
10 between networks, which relays data having a specified format between the networks through the tunnel,

said system having a data relay apparatus within the backbone network,

said data relay apparatus, disposed within a  
15 specified backbone network interposed between networks, which relays data having a specified format from the network through a logical tunnel established within the backbone network, said apparatus comprising: a storage unit that stores information for a relay destination tunnel in  
20 correlation with a destination address at the Network layer of the data; a type determination unit that determines a type of a destination address at the Data Link layer of the data loaded from the network; and a transmission unit that transmits the data to the relay destination tunnel  
25 corresponding to the destination address at the Network

layer stored in said storage unit when the type of the destination address is a broadcast address,

wherein the data is transmitted to the relay destination tunnel corresponding to the broadcast address at the Data Link layer of the data loaded from the network to said data relay apparatus.

12. The data relay system according to claim 11, wherein said storage unit further stores hierarchical information for a relay system together with the information for the relay destination tunnel in correlation with the destination address at the Network layer of the data, and

said data relay apparatus further comprises:

a system determination unit that determines a relay system of data to a transmission destination from the data contents stored in said storage unit when the data is to be transmitted to the relay destination tunnel;

a removal unit that removes header for the Data Link layer from the specified format when the determined relay system is not the one performed at the Data Link layer; and

an adding unit that adds the header for the Data Link layer to the data and relays the data when receiving the data through the relay destination tunnel.



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13. A data relay system, having a logical tunnel established within a specified public network interposed between a specified backbone network and host devices, which relays data between the backbone network and said host devices through the tunnel,

said system having a data relay apparatus within the public network,

said data relaying apparatus, disposed within a specified public network interposed between a specified backbone network and host devices, which relays data between the backbone network and said host devices through a logical tunnel established within the public network, said apparatus comprising: a first type determination unit that monitors contents of the data loaded from said host device and determines a type of the data; a first relay unit that relays data through the tunnel when the type of the data is targeted for a single traffic; and a control processing unit that performs control processing on the data without being routed through the tunnel when the data is a predetermined control packet,

wherein, when the data loaded from said host device is the predetermined control packet, the control processing is performed on the data without being routed through the tunnel.

14. The data relay system according to claim 13 further comprising:

5 a first data relay apparatus, disposed within a specified public network interposed between a specified backbone network and host devices, which relays data between the backbone network and said host devices through a logical tunnel established within the public network, said first data relay apparatus comprising: a second type determination unit that monitors contents of the data  
10 loaded from the backbone network and determines a type of the data; a second relay unit that relays data through the tunnel when the type of the data is targeted for a single traffic; and a storage control unit that stores the data when the type of the data is targeted for broadcast  
15 to a particular group; and

a second data relay apparatus, disposed within a specified public network interposed between a specified backbone network and host devices, which relays data between the backbone network and said host devices through  
20 a logical tunnel established within the public network, said second data relay apparatus comprising: a first type determination unit that monitors contents of the data loaded from said host device and determines a type of the data; a first relay unit that relays data through the tunnel  
25 when the type of the data is targeted for a single traffic;

and a control processing unit that performs control processing on the data without being routed through the tunnel when the data is a predetermined control packet,

wherein said control processing unit of said second data relay apparatus performs control processing so as to relay the data, as a target to be controlled stored by said storage control unit of said first data relay apparatus, to said host device that has issued a specified reception request.

15. A data relay system, having a logical tunnel established within a specified public network interposed between a specified backbone network and host devices, which relays data between the backbone network and said host devices through the tunnel,

said system having a data relay apparatus within the public network,

said data relaying apparatus, disposed within a specified public network interposed between a specified backbone network and host devices, which relays data between the backbone network and said host devices through a logical tunnel established within the public network, said apparatus comprising: an address conversion unit that converts a destination of data transmitted to a specific IP address within the public network, to a broadcast address

of a particular group previously set; a forwarding unit  
that forwards the data, whose address has been converted,  
to a multicast network logically constituted within the  
public network; and a distribution unit that distributes  
5 the forwarded data to said host devices,

wherein the data whose address has been converted  
is distributed to said host devices.